

SOLID WASTE MANAGEMENT UNITS

This enclosure includes the solid waste management units in Sunflower's Restoration Program

SAAP-01

CLASSIFICATION YARD

The Classification Yard is comprised of 42 acres along the railroad yard in the northeastern portion of SFAAP. Incoming raw materials were sorted in this area for diversion to the appropriate receiving facility within SFAAP. The area operated from 1942-1991. Rail operations in the area stopped in 2001. This area produced no hazardous wastes; however, as a result of handling incoming raw materials which may be classified as hazardous, the area had the potential for contamination. Although no spills were reported, the Classification Yard was identified as an area of potential contamination in the 1980 Installation Assessment because of the materials handled and the length of time the area has been in use. A RFI was completed and indicated no contamination above industrial land use standards. AOCs 18-21, as identified in the 1993 EPA photographic study, were added to this site. KDHE has asked for additional groundwater data downgradient of this site. Surface soil sampling will be conducted at the bare spots and other locations to characterize the areas. If contamination is found in the soil, ~400cy will be removed and hauled to an offsite disposal facility and confirmatory samples will be collected. Site closure and a decision document will be completed.

SAAP-002

RIVER WATER TREATMENT PLANT

The River Water Treatment Plant (RWTP), located in the northern portion of SFAAP near the Kansas River, was constructed and started operations in 1943. Water from the Kansas River was treated by lime addition, sedimentation, carbon filtration and chlorination. Sludge from the RWTP was partially used to construct two unlined lagoons south of the plant (upper lagoon 1,269,000ft³, lower lagoon 1,952,000ft³). Wastes from the RWTP were collected in the lagoons (USAEHA, 1978). Water treatment operations at the RWTP ceased in 1971, thus eliminating the effluent of sludge from the RWTP into the lagoons. In the late 1970s, because of the start up of NQ production, the lagoons received about 200,000 gallons per day of discharge from the NQ Area. This included wastewater from tank T784 (SWMU 44) which stored noncontact cooling water, steam condensate, cooling tower blowdown, and ammonia stripper discharge from the NQ production process. The RWTP was leased to a private firm for commercial aquaculture purposes (terminated in Sept 2001). Both lagoons support a variety of aquatic life. Beaver, muskrat, turtles, sunfish and bass, along with aquatic vascular plants and summer algal blooms are commonly observed. Initial RFI results indicated the need for additional GW and sediment sampling. Additional RFI data was collected in FY02. If contamination is found in the sediment, ~400cy will be removed and hauled to an offsite disposal facility and confirmatory samples will be

collected. Future RA will be determined upon completion of investigation. This site will be included in an installation-wide stream study.

SAAP-003

MAIN SEWAGE TREATMENT PLANT

The main Sewage Treatment Plant (STP) is located on 3 acres in the northeastern portion of SFAAP. Operations began in 1943 and continue. The plant treats sanitary wastewater from the installation. Following treatment, water from the plant is discharged into Kill Creek. During the 1950s and 1960s, solids (sludge) from the STP were placed in drying beds east of the Imhoff tank. The digester was last emptied in 1974. Wastewater from various production facilities and laboratories, including a photographic laboratory, processed at the plant may have contained hazardous constituents. According to a 1974 report, no chlorination was provided. This site consists of the drying beds east of the Imhoff Tank. No significant contamination was found during the initial RFI activities; however, further soil investigation is warranted to fully delineate the site. Additional RFI activities will be performed. Sediment removal (~500cy) with offsite disposal may be needed.

SAAP-004

POND A

Pond A is an unlined pond located in the north central portion of SFAAP encompassing ~86,200ft². Pond A was constructed in the 1940s and received wastewater from NC production during periods 1943-1960 and 1965-1971, and water discharged from the NQ Pilot Plant from 1980-1984. Pond A was used for the sedimentation of solids and equalization of wastewater from the NC area prior to lime treatment and subsequent discharge to Pond B (SWMU 6). In addition, Pond A received wastes from many other areas of SFAAP, including the NQ Pilot Plant. The pond now functions as part of the natural drainage system receiving storm sewer outfall from various parts of SFAAP, including drainage from the Industrial Wastewater Treatment Facility Area. An unknown quantity of sludge dredged from Pond A was landfilled on 6.4 acres known as the Sludge Disposal Area, located north of, and adjacent to, the pond. There is a potential safety hazard due to elevated nitrocellulose concentrations in the sludge. Two “zero-gap” tests performed on samples from the sludge disposal area were negative; however, the samples were not collected from areas with elevated nitrocellulose concentrations. Initial RFI (March 2000) results indicated elevated levels of nitrocellulose. Additional investigation will be completed. Approximately 4,000cy of soil may be removed. A pond closure plan will be developed and the pond will be closed. LTM is not anticipated due to insolubility of NC.

SAAP-005

POND A ACID NEUTRALIZATION UNIT

The Pond A acid neutralization unit is located on 6.4 acres on the southeast edge of Pond A. It was constructed in 1943 to treat the acidic wastewater flowing into Pond A from the NC area and had two periods of operation: 1943-1960 and 1965-1971. The pH of Pond A effluent was adjusted in the neutralization unit before draining into Pond B (SWMU 6). Neutralized wastes and unsettled flocculent were discharged to an open drainage ditch leading to Pond B. During a visual inspection in 1990 a white sludge identified as "pebble lime" was piled up along the southeast edge of the plant. Initial RFI data indicates elevated levels of metals in groundwater and elevated levels of nitrocellulose in soil. A CMS study will be completed. Approximately 5,000cy of soil may be removed and/or treated. Pond A will be closed under SAAP-004.

SAAP-006

POND B AND SLUDGE DISPOSAL AREA

Pond B is located in the east-central portion of SFAAP, downstream of Pond A. It is an unlined impoundment situated upon limestone bedrock with a surface area of ~9 acres and a capacity of ~2.2 million ft³ (16.5 million gal). The pond was constructed in the 1940s for sedimentation of solids from the neutralized wastewater discharged from the Pond A Neutralization Unit (SWMU 5). Unknown quantities of sludge were occasionally dredged from pond B and landfilled west of the pond. Pond B discharges into Kill Creek. The pond supports a variety of aquatic life. Small fish were observed in the pond during a site visit in 1988. The risk assessment indicated that potential risk exists through exposure to Kill Creek surface water by recreational receptors. Dieldrin was the primary contributor due to ingestion of fish. Initial RFI results indicated elevated levels of NG in groundwater. Additional investigation including installing monitoring wells is planned. Approximately 40,000cy of soil will be removed and treated. A pond closure plan will be developed and the pond will be closed. LTM is not anticipated.

SAAP-007

NORTH ACID AREA - CHROMATE AREA

The North Acid Area is located in the north-central portion of SFAAP. The North Acid Area manufactured ammonium nitrate liquor from 1947 to 1948 and was dismantled in 1958. The North Acid Area contains 3 SWMUs: the Chromate Area (SAAP-007), the Chromate Concentration Pond (SAAP-008) and the Wastewater Treatment Lagoon (SAAP-009). The Chromate Area consists of ~0.5acre within the North Acid Area. The Chromate Area is the location of the former cooling water treatment unit, including a cooling tower in which chromium-contaminated wastewater was reportedly generated through the use of corrosion inhibitors on the tower. Chromate liquid may have been disposed of in pipes subsequently left buried in the area, and the potential is present for heavy metal contamination. When the site was dismantled in 1958, the 2 wastewater collection basins were left in place. In 1982 and 1983, chromium-contaminated water

was removed from the basins. Water continues to accumulate in the basins. A geophysical survey was conducted and several subsurface anomalies were identified, potentially indicating buried process pipelines. Initial RFI activities indicate the need for additional soil and surface water delineation due to heavy metal and PAH contamination. Additional RFI activities will be performed. Approximately 550cy of soil will be removed and disposed offsite. The removal action will include excavation of debris (subsurface anomalies). Any existing surface water in the basins will be removed. Five years of LTM will be conducted.

SAAP-008

NORTH ACID AREA - CHROMATE CONCENTRATION POND

The North Acid Area is located in the north-central portion of SFAAP. The North Acid Area manufactured ammonium nitrate liquor from 1947 to 1948 and was dismantled in 1958. The North Acid Area contains 3 SWMUs: the Chromate Area (SAAP-007), the Chromate Concentration Pond (SAAP-008) and the Wastewater Treatment Lagoon (SAAP-009). The Chromate Concentration Pond is known to have been located within the North Acid Area, but because the pond has been drained, its location remains uncertain. Reportedly, chromate was used as a corrosion inhibitor in the fixation process at the Nitrogen Fixation Plant. Chromate salts from the neutralization process used to treat chromium sludge were reportedly stored in drums located in the magazine area. These salts proved non-hazardous, and SFAAP received state approval to dispose of the salts in an on-site landfill. The risk assessment found that the primary risk drivers were hexavalent chromium in surface water and PAHs in surface soil. Additional RFI activities will be performed. Approximately 550cy of soil will be removed and disposed offsite. Any existing surface water in the basins will be removed. Five years of LTM will be conducted.

SAAP-009

NORTH ACID AREA - WASTEWATER TREATMENT LAGOON

The North Acid Area is located in the north-central portion of SFAAP. The North Acid Area manufactured ammonium nitrate liquor from 1947 to 1948 and was dismantled in 1958. The North Acid Area contains 3 SWMUs: the Chromate Area (SAAP-007), the Chromate Concentration Pond (SAAP-008) and the Wastewater Treatment Lagoon (SAAP-009). Wastewater treatment practices for the North Acid Area were not documented. It is believed the processes practiced were similar to the traditional wastewater treatment operations practiced in the South Acid Area. This treatment involved lime addition to the wastewater followed by discharge to a holding pond or lagoon. The South Acid Area produced calcium sulfate sludges. Similar sludges are believed to have been produced in the North Acid Area. In addition, there is a possibility that chromate-contaminated water may have been released as waste to this lagoon. The risk assessment found that primary risk drivers were hexavalent chromium in surface water and PAHs in surface soil. Additional RFI activities will be performed.

Approximately 550cy of soil will be removed and disposed offsite. Any existing surface water in the basins will be removed. Five years of LTM will be conducted.

SAAP-010

F-LINE DITCHES

The F-Line Area is located in the east-central portion of SFAAP. This site consisted of sumps, troughs, pipes and other conveyances and ditches used for the management of wastewater from operations in the F-Line Area. F-Line included a blender house where explosive propellant was received and blended with lead salicylate; rolled into sheets; slit and wound into carpet rolls; and extruded by large hydraulic presses into solid propellant grains. Any propellant that was on the floor was washed into the drain with the wastewater. Most of the effluents were then discharged, via unlined ditches, to settling ponds and eventually to Spoon and Kill Creeks; however, one group of the ditches discharged directly to a field adjacent to Spoon Creek. The F-line ditches were located on the east side of the F-Line press houses. Occasionally, propellant solids settled in these ditches before reaching the ponds. The ditches were used periodically from the early 1950s to 1971. Several ditches served as discharge points for runoff from storm drains along the streets in the area. The draft RFI indicates nitroglycerin in soil at concentrations that exceed EPA's target risk range for carcinogenic risk. Lead was found at concentrations exceeding EPA and KDHE guidance values. The Statement of Basis has been completed and recommended soil remediation by excavation, stabilization and disposal. A surface soil (~24,000cy) removal was completed in 2001. In 2001, the size of this site was expanded by ~15 acres to a total area of 40 acres and includes 39 additional building foundations. Approximately 10 acres around the building foundations will require additional investigation. Complete site investigation of 10 additional acres of the site. Additional soil removal is expected (~15,000cy). Five years of LTM will be conducted.

SAAP-011

F-LINE AREA SETTLING PONDS

The F-Line Area is located in the east central portion of SFAAP. Wastewater from the F-Line production facilities drained into ditches, which, for the most part, led to the six F-Line Area Settling Ponds (1A, 1B, 2A, 2B, 3A, and 3B) and two Blender Ponds (4A and 4B). The six Settling Ponds were unlined earthen ponds equipped with stand pipes to permit settling of solids and decantation of water. The northernmost Settling Ponds (3A and 3B) were constructed in 1943 and abandoned in 1971. The remaining ponds were operational from 1943 to 1969. These ponds were used to settle propellant solids from wastewater generated during production of propellants. The ponds were also part of the natural drainage system, ultimately discharging into Spoon and Kill Creeks. During past operations, SFAAP occasionally removed the propellant solids which had accumulated in the ponds and burned them at the burning grounds. The pond sediments were contaminated with uncolloided propellant with lead salts, phthalates and NC from the manufacturing process. The RFI indicated nitroglycerine in soil at

concentrations that exceed EPA's target risk range for carcinogenic risk. Lead was also found at concentrations exceeding EPA and KDHE guidance values. A surface soil (4,500cy) removal was completed in 2001. Five years of LTM will be conducted.

SAAP-012

PYOTT'S POND AND SLUDGE DISPOSAL AREA

Pyotts Pond is located in the east-central portion of SFAAP. It is an unlined, earthen impoundment with a surface area of ~1.7 acres and a capacity of ~697,000ft³ /5.2 million gal. The pond was constructed in 1968 to aide in pollution control. In the past it has received drainage from the South Acid Area, the F-Line Paste Area, the NC Area, the Solvent Area and the NG Area, as well as non-contact cooling water, boiler blowdown and some process water from the South Acid Area. Neutralization of water entering the pond resulted in an accumulation of calcium sulfate sludge, which was periodically dredged and landfilled adjacent to the pond to the north and south. The pond was used primarily for flow control and emergency containment for acid manufacturing. Effluent from the pond drains northeast to Kill Creek, and was monitored by NPDES Outfall 004. The pond supports an active aquatic ecosystem. PCBs were detected in two pond sediment samples. Initial RFI results indicated elevated levels of mercury and nitroguanidine in the surface water. Groundwater contained nitroguanidine, and sediments contained elevated levels of PAHs and nitrocellulose. Additional RFI activities will be performed to fully define the extent of contamination. A pond closure plan will be developed and the pond will be closed. Approximately 7,000cy of sediment and soil will be removed, treated and disposed. Five years of LTM will be conducted.

SAAP-013

SOUTH ACID AREA LWTP EVAPORATIVE LAGOONS

The South Acid Area is located in the east-central portion of SFAAP. The Liquid Waste Treatment Plant (LWTP) consists of 5 above ground tanks: 3 for treating wastewater, 1 for slurrying lime, and 1 for feeding wastewater to be treated. In addition, there were 4 unlined, earthen cells utilized as Evaporative Lagoons associated with the LWTP. Use of the LWTP and lagoons began in 1979. Volumes of waste treated at the LWTP varied with the need of production operations. The plant treated up to 1.5 million gal of corrosive wastewater each month. In the summer of 1986 the lagoons were reportedly nearing their effective capacity, and the wastewater from the lagoons was being applied to land within the plant boundaries. Land application of wastewater had been performed in many areas of SFAAP including the open areas in the western and southern portions of the NQ production area. In a letter dated March 11, 1996, KDHE approved a schedule of work for remediation of the lagoon sludge and dismantlement of the lagoons. This action partially fulfills KDHE requirements for lagoon closure. Additional requirements to complete closure of the lagoons include groundwater monitoring at selected sites downgradient of the lagoons for a period of not less than five years, and submittal of a final work plan for closure activities consistent with

KDHE's pond closure/sampling verification plan. If the groundwater contaminants have not decreased in 5 years, the site will be reevaluated.

SAAP-014

STATIC ROCKET TEST AREA

The Static Rocket Test Area is located in the east-central portion of SFAAP. It encompasses ~3 acres in the northeastern portion of the Proving Ground area. The site includes 4 firing platforms. Two outdoor firing platforms are located immediately north of each of the two Proving Ground buildings. The Proving Ground was used to conduct proof and surveillance tests of manufactured powder and propellants common to cannon and rocket artillery. Tests were conducted between 1965 and 1971. Phase I & II RFI sampling indicated lead, nitroglycerine, propellants, and phthalates in surface soil above action levels. Lead and nitroglycerine were found in the groundwater above action levels. In Feb 2000, EPA ordered SFAAP to conduct stream monitoring. Complete sediment and surface water sampling. A portion of the cost for an installation-wide stream study will be attributed to this site. Remedial activities will consist of soil excavation, treatment and offsite disposal of ~188cy of soil. LTM will be conducted.

SAAP-015

WASTE STORAGE MAGAZINES

The Waste Storage Magazines are located in the southeast portion of SFAAP, and are also known as the J-Magazine Area Buildings. The buildings included in this SWMU are J-117, J-118, J-119, J-120, J-121, J-122, J-124, J-127, and J-128. All magazines used natural lighting to preclude accidental detonation of explosives, are secured with locking doors, and have concrete floors with secondary containment. Materials designated to be stored in each magazine included production waste from propellant manufacturing, spent solvents, and other explosive and hazardous waste. During a site inspection in 1990, rust colored stains were noted on the concrete loading pad at J-127. Initial sample data was found to be unreliable, therefore the site must be resampled. A RFI will be performed.

SAAP-016

TEMPORARY WASTE STORAGE MAGAZINES

Most of the Temporary Waste Storage Magazines are located in the southwest-central portion of SFAAP. This includes the B-Area Storage Buildings B-14, B-16, B-20, B-21 and B-22. Also included in this SWMU is Building 181-2 which is located in the central portion of SFAAP. Building 181-2 is an inactive 12 x 15 ft metal structure that was used to store spent degreasing solvents. The building has a concrete floor and is surrounded by an earthen dike. The solvents which were stored in 181-2 were transferred in 1984 to Building J-125, where temporary spill containment was provided. When the

upgrading of J-124 was complete, the solvents were then transferred from J-125 to J-124. Over time 181-2 contained ~550 gal of spent degreasing solvents. During a site visit in 1990 no signs of past releases were evident. It was noted, however, that the earthen dike for spill containment for building 181-2 was "inadequate." Initial sample data was found to be unreliable, therefore the site must be resampled. A RFI will be performed.

SAAP-017

G-LINE AREA DITCHES

The G-Line Area Ditches are located in the south-central portion of SFAAP. It was a solvent propellant area. No data were available about the period of operation for this area; however, it was reported that during the 1940s the G-line NC wringers overflowed, and NC fines had been observed along drainage ditches from the area leading to Kill Creek. It is likely that G-Line Area ditches received the same types of materials and followed the same historical wastewater treatment practices as the F-Line Area. The G-Line area is situated close to the basin divide between flow westward to Captain Creek and flow eastward to Spoon and Kill creeks. Consequently, it is possible for contamination to migrate in either direction depending on the location of the source of contamination in the G-Line area. In addition, it has been reported that NC spills occurred in the area, and NC wastes were observed in the ditches in the area. It is possible that small amounts of propellant solids containing lead salts may have settled in these ditches. Initial sample data was found to be unreliable, therefore the site must be resampled. A RFI will be performed. A soil removal of ~11,000cy may be required. Long term monitoring is planned.

SAAP-018

OLD/NEW SANITARY LANDFILLS

The entire Landfill Area encompasses ~42 acres located about 1 mile west of the NG Area near the central-western border of SFAAP. However, only a portion of the 42 acres make up the Old/New Sanitary Landfills. The landfills employed a trench-type operation. Several types of landfills are included in the Landfill Area: the sanitary landfill (17 acres); the asbestos landfill (1.1 acres) and the ash landfill (10 acres, SWMU 19). This Landfill Area began operation in 1943. Prior to the designation of the New Sanitary Landfill in 1967, refuse of all types was buried at a site just south of the new landfill. No records from the Old Landfill were available. SFAAP no longer uses the New Sanitary Landfill; currently, waste is disposed off-site. Although there was no hazardous waste placed in either landfill, there is one area reported to have received containers of a lead compound east of the landfill, and 2 areas with known asbestos waste near the Sanitary Landfill. The RFI report states that the primary concerns at SFAAP-018 and 019 are the constituents detected in groundwater (sulfide; cis-1,3-dichloropropane and ammonia nitrogen) and dioxins/furans in the shallow soil. Institutional controls have been implemented (fencing) to control site access. An IRA for erosion control was completed. Additional RFI activities will be performed to

delineate the extent of soil and groundwater contamination. Remedial action activities will include construction of a landfill cap this includes capping and monitoring of SFAAP-049. LTM will be required.

SAAP-019

ASH LANDFILLS

There are two, unlined ash landfills. One landfill (~9 acres) is located north of the Sanitary Landfill, in the central-western portion of SFAAP. The area of SAAP-019 adjacent to SAAP-018 will be addressed under SAAP-018. The other landfill is located southeast of Power House #1 (~1 acre). It has been reported that these landfills were used prior to 1966. The ash landfills contain unknown quantities of fly ash from the ash-sludge system and coal fines from the coal pile. Fly ash sometimes contains heavy metals. The area of SAAP-019 adjacent to SAAP-018 will be addressed under SAAP-018. In the area southeast of Power House #1, ~1,000cy of material will be excavated and disposed on-site.

SAAP-020

ASH LAGOONS AND SLUDGE DISPOSAL AREA

The Ash Lagoons and Sludge Disposal Area are located on 17 acres in the north-central portion of SFAAP. There are four Ash Lagoons, all are 15 feet deep. Lagoon 165-1 is 103,600 ft², Lagoon 165-2 is 118,900 ft², Lagoon 165-3 is 95,000 ft², Lagoon 165-4 is 10,000 ft². These lagoons began operation in 1979 to collect fly ash and bottom ash from the boiler house via an ash-sludge system. The ash wastes (which may contain heavy metals) were allowed to settle out in the lagoons and the slightly alkaline wastewater was filtered and recycled back to the boiler house. Lagoons 165-1, 165-2, and 165-3 were periodically dredged and the sludge was landfilled in the Ash Landfill (SWMU 19). The lagoons are located just south of Pond A; however, discharge most likely flowed in the direction of the topographic slope to Pond B, located 2,000 feet east of the lagoons. Reports from site visits in 1987 and 1990 both indicated that the embankments of the lagoons appeared to be in good condition. The lagoons are reportedly unlined; however, logs from a 1992 site visit indicated one lagoon appeared to have a liner. Unlined lagoons present a pathway for constituents to migrate into the groundwater. Initial RFI activities indicated no groundwater contamination; however, additional sampling of the lagoons will be required.

SAAP-021

CONTAMINATED MATERIALS BURNING GROUND

The Contaminated Materials Burning Ground consists of approximately four acres located in the west central portion of SFAAP. The site was brought into operation in 1943 to decontaminate scrap metal (which is later salvaged) and to burn other combustible material that had been contaminated with explosives or propellants. Prior

to 1970, burning of contaminated materials occurred in two open trenches. However, in about 1970, two unlined 30 x 300ft pads were installed where the trenches were located. The pads were separated by an earthen berm. Contaminated material accumulated at the site until the pad was full, which generally took ~1-2 months. Burning was initiated using diesel fuel, waste oils, and scrap wood (including telephone poles). SFAAP randomly sampled the remainder of the residue for EP toxicity metals (leachable), and upon negative results disposed the ash in the sanitary landfill. After one pad was burned, the other pad began receiving materials for the next burn. During a site visit in 1990, burn areas were observed away from the main burn pads. Also located on the site is an open top tank, ~8ft in diameter, which was used to burn waste solvent. Adjacent to the tank is an elevated platform which appeared to have been used as an unloading dock for liquids to be emptied into the tank. At the time of a 2001 site visit, the tank contained water. Groundwater and surface water runoff from the burn area flow northwest to Captain Creek or the adjacent oxbow lake. Phase I & II RFI results indicated the presence of dioxins, metals, solvents, and petroleum hydrocarbons in soil. Petroleum hydrocarbons and volatile organic compounds were detected in groundwater and surface water. A pre-design investigation has commenced and will include a soil treatability study, a bench scale groundwater pilot study and a hydrologic assesment to define the RA. Remedial action may consist of excavation and offsite disposal of ~2,000cy of wastes. Five years of LTM will be conducted.

SAAP-022

OLD EXPLOSIVE WASTE BURNING GROUND

The Old Explosive Waste Burning Ground is located north of the Contaminated Materials Burning Ground (SWMU 21) in the west central portion of SFAAP. In this area, waste explosives including NG slums (i.e., NG mixed with sawdust for stabilization) and various propellant formulations from the sumps, filters, and drains in the production areas were disposed by open burning on designated pads. The site was in operation from 1943 to 1980. It is ~7 acres consisting of 5 burning trenches, an NG dump area, and a lead recovery area (SWMU 32). During a Ground-Water Contamination Survey in 1987 the USAEHA reported that the site was a grass covered field showing no signs of vegetative stress. RFI and CMS activities are complete; however, additional RFI activities will occur for the installation-wide stream study (SAAP-066). Lead and NG were detected in surface soil above action levels. The Army has initiated soil treatability testing from SWMUs containing similar wastes (metals and explosives) in an effort to develop a facility-wide technique for bulk soil remediation. Ex-situ stabilization is underway to treat ~4,400cy of contaminated soil, in accordance with CMS recommendations. LTM will be conducted.

SAAP-023

NEW EXPLOSIVE WASTE BURNING GROUND

The New Explosive Waste Burning Ground has been in operation since 1980 when it replaced the Old Explosive Waste Burning Ground (SWMU 22). It is located in the

southwest portion of SFAAP and consists of a diked earthen pad measuring 130 x 340ft. A maximum of 5,000lbs of explosives may be burned on this pad at one time, and smaller quantities may be detonated. Waste NQ, GN, explosives, and propellants of various formulation have been burned and/or detonated at this site. Releases to the soil were reportedly evident, as indicated by stained soils observed at the time of a site visit conducted in 1990. This unit is currently listed on SFAAP's RCRA Part A Application; and the Subpart and Part B Application. Physical remediation is complete and the final report was submitted to the EPA and KDHE in 2000. Final clean closure acceptance by regulatory agencies was received in 2000. No further action is needed at this site. The wells will be closed under SAAP-018.

SAAP-024

NITROGLYCERINE AREA DITCHES

The NG area is located in the central portion of SFAAP. NG manufacturing in this area began prior to the end of World War II and continued until 1971. Two operating lines provided nitrated glycerine for use in the paste area. There were several recorded instances where NG spilled onto the soil in the NG area. The amount of NG spilled ranged from 1-2 lbs to a 1,200 lbs spill in August of 1944. This site drains into Pyotts Pond. Field observations in 1985 indicated the main ditch contained between ten and fifteen inches of stagnant water, with grass present throughout most of the length. Investigation activities identified 11 sumps as possible explosive hazards. The sumps have been fenced to limit access. Elevated levels of lead in soil and surface water were detected, probably resulting from drainage from the paste area. Additional RFI investigations will be performed to fully define the extent of contamination. Remedial activities will include excavation, treatment (stabilization) and hauling ~10,000cy of materials to an offsite disposal facility. The sumps will be sampled remotely and stabilized. An appropriate remedial action for the sumps will be determined. Five years of LTM will be conducted.

SAAP-025

NITROCELLULOSE AREA DITCHES

The NC Area is located in the north central portion of SFAAP. NC is prepared by the reaction of cotton linters (cellulose) and a mixture of nitric and sulfuric acids. NC was produced during two periods, 1943 through 1960 and 1965 through 1971. Nitrocellulose was detected in the soils during initial RFI activities. Additional RFI activities will be performed to fully define the extent of contamination. Remedial activities will include excavation, treatment and disposal of ~1,800cy (2,500 linear feet of ditch soil) of contaminated soil.

SAAP-026

SINGLE BASE PROPELLANT AREA WASTEWATER SETTLING SUMPS

The Single Base Propellant Area consists of a series of buildings in the north-central portion of SFAAP. Single base propellant for small arms, cannon, and rockets was produced in this area during the periods of 1943-1948, 1951-1960, and 1965-1971. There were four different types of production buildings in this area numbered 1600, 1650, 1700 and 1725 series. There were wastewater sumps adjacent to each of the 1600 and 1650 series buildings which were designed to settle out solids from the building's wastewater. Flow equalization tanks were located adjacent to each of the 1700 and 1725 series buildings. Each of these tanks was covered by an open wooden grate. Wastewater from the sumps and tanks was discharged to a collection sewer which eventually discharged to open ditches. These ditches discharged west into Captain Creek. The three southeast buildings' wastewater drained east and eventually discharge into Pond A. At the time of the USAEHA study in 1985, all the sumps contained standing water, soil, and pieces of rotted wood from the baffles, all of which appeared to have partially decayed. The buildings in this area were undergoing removal via demolition and burning in 1990. At the time of the 1992 site visit, some of the buildings which fed the sumps had already been removed. Remediation will consist of soil removal from impacted areas outside the building foundations and drainage areas. Initial samples were found to be unreliable, and therefore the site must be resampled. Additional RFI sampling activities will be performed to fully define the extent of contamination around building foundations (10%) and ditches (100-foot intervals). Intensive visual inspections will be conducted to substantiate the presence of propellants in areas not sampled. Remedial activities will include excavation, treatment, and disposal of ~2,100cy of contaminated soil from base of building foundations. (Estimate of 100 buildings, foundations measuring 20 X 50 feet. Army will excavate 2' X 2' trench around each building foundation or 21cy per building). There are ~1,500 feet of ditches, averaging 8-feet wide. The Army will excavate a minimum of 6-inches of soil from ditch bottoms (230cy). Confirmatory sampling for metals, phthalates, and NC will be conducted at 50-foot intervals in ditches and one sample per building sump.

SAAP-027

NQ AREA SAC & LWTP EVAPORATIVE LAGOONS

The NQ Area is located in the northwest portion of SFAAP. The Sulfuric Acid Concentrator (SAC) Liquid Waste Treatment Plant (LWTP) went into operation in 1984. It consisted of a 45,000-gal tank for distillate and a 17,000-gal tank for other corrosives. It received corrosive distillate from the SAC and some corrosive wastewater from the NQ production processes. Lime neutralizers were added to the acidic wastewater, which then flowed into the two Evaporative Lagoons located south of the LWTP. The wastewater transfer line from the LWTP to the evaporative lagoons had documented releases. The lagoons were constructed in 1984. At the time of the 1987 investigation, the lining of the lagoons appeared damaged. Observations of higher soil moisture and occasional small amounts of water at the base of the berm on the west side of the southern lagoon indicated releases were occurring. The lining was replaced. It was

reported that when the liner was replaced in one of the lagoons, the breaks in the old liner indicated that release to the underlying soil did occur. In 1996 the lagoons were remediated and dismantled under an agreement with KDHE, constituting partial fulfillment of requirements for lagoon closure. The lagoons have been capped and final grading and seeding was designed for minimal surface water infiltration and erosion. Confirmation soil samples were collected in FY02 along the LWTP transfer line. Additional requirements to complete closure of the lagoons include groundwater monitoring at selected sites downgradient of the lagoons for a period of not less than five years, and submittal of a final work plan for closure activities consistent with KDHE's Nonhazardous Industrial Wastewater Lagoon Closure requirements.

SAAP-028

WASTE CALCIUM CARBIDE TREATMENT AREA

This site is a state regulated unit and was closed outside of the ER,A program. No further action is planned under the IRP.

SAAP-029

INDUSTRIAL WASTEWATER TREATMENT LAGOONS

This site is a state regulated unit and was closed outside of the ER,A program. No further action is planned under the IRP.

SAAP-030

PESTICIDE HANDLING AREA

The Pesticide Handling Area is located in the north central portion of SFAAP, with a new building erected a short distance from the old structure that it replaced. The old facility and its surrounding area were reportedly cleaned of pesticide residues. The new facility met USAEHA's *Criteria for Design of a Pest Control Shop, Pesticide Storage and Mixing Facility*. It has been in operation since 1984. The facility contains four sumps, one in each area: the pesticide storage room, the herbicide storage room, the inside mixing room and the outside mixing area. Reportedly all liquid within the sumps is recycled into formulations, and there is no discharge from the sumps. No spills or releases have been recorded for this site. During a Preliminary Review site visit to the Pesticide Handling Area in 1990, an aqua-blue stain was evident at the outside sump and outside the pesticide building. It was identified as a dibromide solution which is sprayed in areas where herbicides/pesticides are used. Any contamination is assumed to have resulted from operations at the former area. It was also noted that stressed vegetation was observed leading from the shop and following a newly constructed road; however, SFAAP personnel indicated an underground steam line in the area may have impacted the vegetation. Initial samples were found to be unreliable, therefore the site must be resampled. Additional RFI activities will be performed to fully define the extent of contamination. Potential remedial activities may include excavation and disposal of

~1,500cy of pesticide contaminated materials to an offsite facility. Confirmatory sampling will be performed.

SAAP-031

CONTAMINATED WASTE PROCESSOR & EVAPORATIVE LAGOON

The Contaminated Waste Processor (CWP) and Evaporative Lagoon are located in the central portion of SFAAP close to its western border. The CWP is an incinerator measuring ~40 x 60ft. The CWP was designed to incinerate materials contaminated or suspected of being contaminated with explosives, and to decontaminate (flash) explosive-contaminated metal prior to salvage. Because the CWP could only handle materials with residual amounts of explosives, the waste materials to be incinerated were checked to insure they did not contain pockets of explosives. Waste residuals from the CWP were also analyzed for EP Toxicity. If results indicated the waste was hazardous it was treated/disposed off site at a hazardous waste treatment facility. Otherwise it was landfilled on site. The CWP operated between 1982 and 1996. Three existing monitoring wells have been in place around the lagoon since 1981. There is a potential for trace concentrations of explosives and propellant compounds such as NG, DNT, and soluble lead to be present after incineration. While these would not be explosion or fire hazards, they may be soluble and could potentially contaminate groundwater. Initial RFI results indicated the presence of phthalates in the soil samples. No contamination has been found in the groundwater. Additional RFI activities will be performed to fully define the extent of contamination. A remedial action including excavation, treatment, and disposal of ~800cy of contaminated soil will be performed. Confirmatory sampling will be conducted. The lagoon will be closed in accordance with KDHE Nonhazardous Industrial Wastewater Lagoon Closure requirements.

SAAP-032

LEAD DECONTAMINATION AND RECOVERY UNIT

The Lead Decontamination and Recovery Unit is located on the central portion of SFAAP near the western border. The facility borders the Captain Creek flood plain. Surface drainage is toward a southwest drainage ditch which subsequently drains west near the Old Explosive Waste Burning Ground (SWMU 22) to Captain Creek. Some runoff also eventually drains into an oxbow lake near Captain Creek. The site consists of a small building and melting rack within a paved area, and encompasses approximately one half acre. The Recovery Unit was in operation from 1943 to 1970. Contaminated lead recovered from routine maintenance activities in the acid, NG, and propellant manufacturing buildings was placed on a rack and suspended over a tank. An overhead heater melted the lead, which then dropped into the tank. The lead was drained into molds and made available for salvage. Lead solids have been observed scattered throughout the site. Lead is the primary constituent of concern at this site. It is somewhat soluble under acidic conditions. RFI results indicated lead in soil above action levels. An underground storage tank (UST) was removed from this site under the UST program. Fuel oil contaminated soil associated with the UST will be addressed

under this site. The CMS was completed and the lead contaminated soil (803cy) was excavated, treated and disposed off-site in FY02. Additional RFI will be completed for the petroleum area. Soil removal (~500cy) is expected to be needed. Long-term monitoring will be conducted in conjunction with SWMU 22.

SAAP-033

PASTE AREA HALF TANKS AND DITCHES

The Paste Area is located in the central portion of SFAAP just northeast of the NG Area. The Half Tanks in this area received wastewater from wash down of propellant processing equipment and buildings in the Paste Area, and possibly from buildings in the NG Area as well. They were used between the mid 1960s and 1971. The tanks discharged into 2 unlined settling ponds, then to Pyotts Pond. There are 2 steel Half Tanks located upgradient from each of the settling ponds and are designated Half-Tank 33/34 and 33/35. The 33/34 tanks are located southeast of the Paste Area between the Five Corners Settling Ponds and the Paste Sump, and the 33/35 tanks are located northwest of the Paste Area near the NG Settling Ponds. According to a survey, the settling ponds were abandoned and in disrepair. As a result, unidentified quantities of NC and NG were known to be in and around the lagoons. Drilling was not recommended in the area because pond sediment samples were demonstrated to constitute a reactivity/ignitability hazard, as identified from analysis conducted at the SFAAP laboratory. Reportedly, overflowing of the metal flumes and half tanks occurred. There was no secondary containment. The IRA occurred in FY02 and consisted of removal and decontamination of the Half-Tanks, removal of ~60cy of impacted soils from the Half Tanks and ~700 cy of contaminated soil from drainage ditches extending from each tanks to its stream discharge point. Confirmation samples were collected to verify that remaining soils met KDHE requirements. The ditches extending from the Half-Tanks, up gradient to the source area, will be remediated as part of the SWMU 24 cleanup. No further action anticipated for this site.

SAAP-034

FIVE CORNERS SETTLING PONDS

The Five Corners Settling Ponds are located in the central portion of SFAAP, immediately south of the Paste Area and immediately east of the NG Area. There were 2 earthen, unlined ponds (5A, 5B), each ~40ft in diameter. The ponds were used periodically from the early 1950s to 1971. There are no containment berms surrounding these ponds. The Settling Ponds received NG wastewater resulting from the wash down of equipment and buildings and from sprinkler trips. RFI results indicated the presence of lead, nitroglycerin, nitrocellulose, and SVOC's in soil. The IRA occurred in FY02 and consisted of removal of 900cy of contaminated soil and regrading. Wells will be sampled prior to applying for pond closure.

SAAP-035

NITROGLYCERINE AREA SETTLING PONDS

The NG Area Settling Ponds were located in the central portion of SFAAP, at the northeastern edge of the NG Area just north of the Paste Area. The 2 ponds (6A, 6B) were used periodically from the early 1950s to 1971 to receive wastewater resulting from the wash down of equipment and buildings, and from sprinkler trips. The propellant solids and sludge which settled in the ponds were occasionally removed during production and burned at the burning grounds. These ponds were investigated in 1985 and designated as Pond 6A (the southern pond) and Pond 6B (the northern pond). During site visits in both 1985 and 1987, Pond 6A was reported to contain approximately 16 inches of standing water, while Pond 6B was dry. Both ponds contained ~12-18 inches of sediment which appeared to be soil. RFI results indicated the presence of lead, nitroglycerin, nitrocellulose, and SVOCs in soil. The IRA occurred in FY02 and consisted of removal of 1,300cy of contaminated soil and regrading. Wells will be sampled prior to applying for ponds closures.

SAAP-036

N-LINE AREA

The N-Line is located in the south central portion of SFAAP. Production occurred in this area during three periods of operation: 1943 through 1946; 1951 through 1960; and 1965 through 1971. In this area the final machining and inspection of extruded and cut propellant grains occurred. Off-spec materials and trimmings were sent to a grinding mill and then back to the F-Line Area for reblending. Wastewater originated primarily from floor and equipment washing and flowed through floor drains into unlined ditches which lead to a small tributary of Spoon Creek. There were ~20 eastwardly trending ditches and 2 concrete settling sumps. During several site visits in the late 1980s, the ditches were reportedly well vegetated, except those which received storm water. Propellant solids containing NG and lead salts settled in these ditches. The propellant formulations stored in this area were single or double base and were generally reactive. The N-Line was known as the solventless propellant area along with the F-Line. The RFI report states that risks due to the ingestion of groundwater by residential receptors exists. The RFI recommended CMS and removal action. Propellant and lead contaminated soil was identified during the RFI. Lead and nitroglycerin were found in groundwater. In 2001, this site was increased by 14 acres to a total size of 67 acres. This additional area will need to be investigated. Additional RFI activities will be performed to determine extent of contamination. Remedial activities will include excavation, treatment and disposal of ~15,000cy of contaminated soil. Waste propellant will be removed from the two sumps and confirmatory sampling will be conducted.

SAAP-037

SANDBLASTING AREAS

Sandblasting occurred in several locations during various periods of operation. From

~1964 to 1969, an area east of the former Maintenance Office Building 245-3 was used for sandblasting. Between 1980 and 1984, an area west of the Paint and Sign Shop Building 504 was used. Additionally, documents indicate an area south of the Equipment Storage Building 566-1 was used. It is believed this area was used prior to 1980, but records of this use were not available. Sandblasting was used to prepare equipment such as motors, pumps, pipes, trailers and heavy equipment for painting and preservation. The bulk of the sand recovered was disposed in the sanitary landfill; however, residual sand was left on the ground in these areas. In addition, sand was not contained during the sandblasting operations and was therefore able to migrate through the air. The primary concern at these sites are paint wastes and their constituents, especially metals such as lead, chromium, and cadmium. Initial samples were found to be unreliable, and therefore the site must be resampled. Additional sampling will be completed. The project will proceed with excavation, treatment and disposal of 3000cy of contaminated soil.

SAAP-038

OIL WATER SEPARATOR

The Oil Water Separator was located in the north central portion of SFAAP. It began operation in 1971 to service the auto maintenance shop located in Building 542. A majority of the flow to the separator was derived from the floor drain in the car wash bay. Additional wastewater sources include rainwater and condensate from steam radiators used to heat the building. Although no oil or grease was reportedly dumped into the drains leading to the separator, a small quantity of sludge collected in the tank. Sludge was removed from the tank in 1987 and tested for TCLP prior to transfer to the Sanitary Landfill (SWMU 18). This was the first recorded removal of sludge. During a site visit in 1990, the integrity of the tank was questioned because there was influent to the separator, but the tank did not appear to be filling. Oil stains and bare ground were noted under and downgradient of the half tank. It was also indicated that there was visual evidence of potential release to the surface water and soil. Initial samples were found to be unreliable, and therefore the site must be resampled. Additional soil and groundwater sampling will be performed.

SAAP-039

SOUTH ACID AREA WASTEWATER RUNOFF

The South Acid Area is located in the east central portion of SFAAP. Two primary drainage ditches originate near the Calcium Carbide Disposal Area (SWMU 40). A third influent ditch joins the west ditch. All three ditches discharge into Pyotts Pond. During a site visit in 1990, the surface water observed in the east ditch was tinted orange; a white precipitate was observed along both ditches. Reportedly the orange color was caused by the neutralization of acidic ferrous sulfate and sulfuric acid with hydrated lime. The sediment was reported to contain ferrous sulfate and calcium sulfate. Wastes handled at this site include sulfuric and nitric acids which may have contained NG, and wastes from the SAC LWTP which may have contained NQ. The sediment at

this site reportedly contained ferrous sulfate and calcium sulfate resulting from hydrated lime dehydration of sulfuric acid and acidic ferrous sulfate. Initial samples were found to be unreliable, therefore the site must be resampled. Additional samples will be taken in the ditches.

SAAP-040

CALCIUM CARBIDE DISPOSAL AREA

The Calcium Carbide Disposal Area is located in the east central portion of SFAAP. Waste from the operation of the NQ pilot plant was disposed of in a natural ravine at this site. Calcium cyanamide was generated from wet guanidine nitrate (GN) production and delivered to the NQ pilot plant from the main NQ Area. Whenever the carbide content was too high for acceptance at the pilot plant, the calcium cyanamide was taken to the Calcium Carbide Disposal Area. The calcium cyanamide and calcium carbonate sludge was disposed of in this area for only a 3-month period in 1982. The waste material, consisting of calcium cyanamide and fluorspar, was later covered to form a landfill, and enclosed by a barbed-wire fence. The fenced-in area comprises approximately one acre; however, less than half of the area was actually used for disposal of the calcium carbide waste. The 200' X 60' disposal area is located in the northeastern portion of the landfill, an area which is now a grassy plateau which slopes downward ~15ft. An evaporation pond is located in the southwest portion of the landfill. White and black stains were observed along the edges of the pond during site visits in 1989 and 1990. There is some concern that the surface water runoff from this site drains to Pyotts Pond via the South Acid Area Drainage Ditch discussed in the previous section (SWMU 39). Initial samples were found to be unreliable, therefore the site must be resampled for SVOC, VOC, metals, sulfates and cyanide. Additional RFI activities will be conducted to determine the extent of contamination. Approximately 5,000cy of waste will be removed from the disposal area.

SAAP-041

CALCIUM CARBONATE CAKE (CCC) LANDFILL

The Calcium Carbonate Cake (CCC) Landfill is located in the west central portion of SFAAP. It measures ~350 x 315ft and was operated from May 1986 to June 1988. Between May 1988 and December 1991, the CCC was provided to farmers rather than landfilled. This practice was discontinued in December 1991. Initially, containerized CCC was disposed of at this site, but later uncontainerized CCC was deposited. The source of CCC was NQ production. CCC is a byproduct of GN manufacturing. GN is an intermediate product of NQ. A leachate collection system was installed in the CCC Landfill at the time of construction. The leachate in the collection system tank is reportedly monitored. During a site visit in 1990, it was noted that the landfill cap was cracked, vegetative cover was sparse, and erosional features had developed. In 1998, the landfill cap was repaired and graded to minimize erosion. Also, new ground cover was established. All work was inspected and accepted by KDHE representatives. Per

KDHE's requirement, additional wells were installed in FY02. LTM will continue. The cap is maintained with non-IRP funds.

SAAP-042

TEMPORARY SANITARY LANDFILL

The Temporary Sanitary Landfill is located in the west central portion of SFAAP, adjacent to the CCC Landfill discussed in the previous section (SWMU 41). It was used to manage non-hazardous solid waste consisting of general trash and sanitary waste. CCC was initially landfilled in the first cell; however, that practice was discontinued. It was reported that empty pesticide bottles were observed lying in and adjacent to standing water at the time of the 1990 site visit; however, SFAAP reported these bottles were triple rinsed prior to disposal. During the site visit in 1992, it appeared that the landfill consisted of three cells. The cap is maintained with non-IRP funds. Groundwater monitoring will be addressed under SFAAP-041.

SAAP-043

TUNNEL DRYERS (CCC STORAGE)

There are a total of six Tunnel Dryers, all were used for Temporary storage of CCC. Four of the dryers are located in the west central portion of SFAAP. The 2 remaining dryers are located in the southern portion of SFAAP. The dryers began operation in 1986. Each dryer measures ~125 x 18ft, with 6ft high walls, and each has a leachate collection system. CCC was a byproduct of the GN step of the NQ production process. The CCC was loaded into dump trucks via conveyor in the NQ area and transported to the Tunnel Dryers. The CCC was dumped into the dryer and arranged using a front-end loader. The product was ultimately offloaded from the Tunnel Dryers by vendors. The tunnel dryers are not enclosed. During a site visit in 1990, it was observed that CCC had been tracked beyond the walls of the tunnel dryers by the trucks loading and unloading at the site. Initial groundwater samples were found to be unreliable, therefore the site must be resampled. The extent of soil contamination has not been determined. Additional RFI activities will include sampling of soil and groundwater. Five new wells will be installed.

SAAP-044

TANK T784

Tank T784 is located in the northwest corner of the NQ Area in the northwest portion of SFAAP. Limited production began in the NQ Area in 1981. Tank T784, also known as Structure 9049, is a vertical steel above ground wastewater collection tank which held cooling tower blowdown water, NQ crystallizer condensate, GN evaporator condensate, and non-contact cooling water. A pipe discharged the wastewater from T784 into the River Water Treatment Plant (RWTP) Lagoons (SWMU 2), via an underground transfer line. This pipe follows the north plant boundary before turning directly north towards the

lagoons. Several releases have occurred as a result of breaks in the RWTP Lagoon transfer line. Tank overflows have also occurred. There are no spill containment structures for the tank. Initial samples were found to be unreliable, therefore the site must be resampled. Additional RFI activities will be conducted to determine if contamination is present in the soil and groundwater.

SAAP-045

BUILDING 9040 (CALCIUM CYANAMIDE CONVEYORS & STORAGE UNIT)

Building 9040 is the wet GN building. It is located in the central part of the NQ Area in the northwestern portion of SFAAP. The NQ Area began limited production in 1981. Calcium cyanamide was produced in Building 9004 and transferred via belt conveyor to Building 9040 for use in the GN process. The belt conveyor, which lead to storage bins located on the East Side of Building 9040, is enclosed in an elevated, sheet metal galleyway. There are four 175-ton storage bins. Calcium cyanamide was released at the bins because of problems with the screw conveyors used to transport material from Building 9004. A concrete pad was constructed in a small portion of the area under the storage bins; however, the pad was too small to effectively contain the spillage, especially in windy conditions. Bare spots were observed in areas near the storage bins. A drainage divide is located in the NQ Area running east of Building 9040. It separates the Captain Creek drainage area from the area drained by unnamed creeks flowing northward toward the Kansas River. Initial samples were found to be unreliable, therefore the site must be resampled. Additional RFI activities will be completed to include a hydrologic assessment and collection of geotechnical and geochemical data to facilitate a technology evaluation of potential remedies to address nitrate contaminated groundwater. A Corrective Measures Study will be produced to evaluate potential remedial options. Continue to monitor groundwater.

SAAP-046

DECONTAMINATION OVEN

The Decontamination Oven is located in the northeast portion of SFAAP. The oven was constructed in 1970 and was used to decontaminate oversized equipment/materials contaminated with trace explosives. There were no secondary containment features at this site (PRC, 1990). Only trace explosives were treated in this area. It may have been possible for volatile contaminants to be released via the exhaust fan during heating. Lead may have been released from the equipment and vehicles decontaminated at this site. Initial samples were found to be unreliable, therefore the site must be resampled. Additional soil samples will be taken. It is expected that the ~400cy of contaminated soil will be excavated, stabilized and disposed.

SAAP-047

NITROGUANIDINE PRODUCTION AREA (23) SUMPS

The NQ manufacturing facilities are located in the northwest corner of SFAAP. Construction of these facilities began in the late 1970s with limited production during 1981. In August 1984, the plant began bulk production of NQ, producing ~4.9 million pounds through 1985, and 7.7 million pounds in 1986. There are 23 sumps in the NQ Area. Each of the production buildings had dedicated sumps outside the buildings which received wastewater generated by operations in the NQ Area. The wastewater resulted from equipment washdowns, spills, runoff, and non-contact operations, such as cooling water and steam condensate. The wastewater may have been acidic, and may potentially have contained contaminants such as NQ and GN, as well as raw process materials or intermediates of the NQ process. Initial RFI results indicate elevated levels of nitrates in groundwater. Elevated levels of sodium were also detected. Additional groundwater investigation will be completed. A CMS will be completed to evaluate potential remediation options (ie. pump and treat or installation of an interceptor trench or french drain) to address nitrate contaminated groundwater. If possible, the water will be used for irrigation. Twenty-three sumps will be excavated and backfilled with clean soil. LTM will be funded under SAAP-045.

SAAP-048

NITROGUANIDINE SUPPORT AREA

The NQ Support Area is located in the north central portion of SFAAP in Buildings 2000 and 2012. The equipment included dryer bays, aboveground storage tanks, and half tanks. This was the location of the pilot-scale production plant known as the NQ Support Equipment (NSE) facility. The NSE facility was constructed during 1977-1980 and was operated periodically as a partial proveout from May 1979 to June 1984. In August 1984, the main NQ plant began production. The majority of the pilot plant was demolished sometime following shut down; however, Buildings 2000 and 2012 are still present. RFI results indicate the presence of elevated levels of nitrates and sulfates in soil and groundwater. LTM will be conducted.

SAAP-049

ROAD JUST SOUTHEAST OF THE SANITARY LANDFILL

The Road just southeast of the Sanitary Landfill is located on ~9 acres near the central western border of SFAAP. Along the road located just east of the Sanitary Landfill (SAAP-018) is a steep slope, which, upon inspection, revealed the presence of drums, construction rubble and other refuse apparently underlying the road. It appears the road may have been built over the landfill or may be comprised of fill from the landfill to construct the road base. A geophysical survey indicated the presence of subsurface anomalies south of SAAP-018 that may include metal objects. Additional samples will be collected to insure that this site is not a contributor to groundwater contamination at

SAAP-018. This site may be capped and monitored consistent with the remedial action at SAAP-018.

SAAP-050

DISPOSAL SITE EAST OF THE CLASSIFICATION YARD

SAAP-50 consists of two areas. The first area (50 north) is an abandoned dump site (6.5 acres) that was discovered just inside the eastern boundary of SFAAP near Kill Creek. The second area (50 south) consists of another abandoned dump site (3.2 acres) immediately adjacent to the other area. The debris scattered about both sites includes shingles, drums and metal slag. An interim removal was accomplished in FY97. Additional debris was removed and rip-rap was placed over select areas to stabilize the bank in 2000. Cover maintenance will continue.

SAAP-051

NEW RECLAMATION YARD

The New Reclamation Yard is located on ~10.6 acres in the north central portion of SFAAP and includes the Battery Handling Area. The New Reclamation Yard was used to stage scrap materials and excess equipment. Scrap was decontaminated to 5X standards prior to sale or reclamation. In the battery handling area, battery parts were observed on the ground. Wastes typically associated with batteries include acids and metals, particularly mercury, lead and/or cadmium depending upon the types of batteries. Initial samples collected in the battery handling area were found to be unreliable, therefore the site must be resampled. Additionally, samples will be collected to characterize the entire New Reclamation Yard. Additional samples will be taken. Approximately 3,200cy of lead contaminated soil will be excavated, treated and disposed. Confirmatory sampling will be conducted.

SAAP-052

PAINT BAY BUILDING 542

Building 542 is located in the north central portion of SFAAP. A paint bay, located within the building, was used to repaint vehicles. Fumes and overspray were vented through the side of the building where stressed vegetation has been observed. Wastes typically associated with paint bays include volatile organics and metals such as chromium, cadmium and lead. Initial samples were found to be unreliable, therefore the site must be resampled. Additional samples will be taken to define the extent of contamination.

SWMU-53

BURN AND DEBRIS AREA NORTH OF STP

The Burn and Debris Area North of STP (Sewage Treatment Plant) is located on ~1 acre in the northeast portion of SFAAP. A sequence of aerial photographs taken of SFAAP beginning in 1941 and ending in 1991 show the old Burn and Debris Area. An inspection was done on September 18, 1997. A wood pile is still there, but the road is covered over with vegetation. The debris begins around the fence line near the main road by the sewage treatment plant. It is comprised of construction debris including heavy duty concrete rubble, rusted out 55-gallon steel drums, glass rubble, broken insulators, pipe debris, wood scraps, telephone poles, wire fencing, concrete pipe pieces, iron scraps and asbestos materials. The debris covers ~1 acre and extends from the fence line, following the creek until reaching the open area where a quarry existed. Debris is on both sides of the creek and in the creek bed itself. A RFI will be completed. Soil/debris removal (~500cy) may be needed. Long-term monitoring is expected.

SWMU-54

FLUORESCENT TUBE WELLS

SWMU 54 is three Fluorescent Tube Wells located in the northwestern portion of SFAAP, east of the NQ production area. The sites consists of hand dug water wells that were part of old pre-SFAAP homesteads. One of the wells is five feet in diameter, about twelve feet deep and lined with concrete. This well was used as a fluorescent tube disposal pit. It is uncertain when this occurred, but is suspected to have taken place prior to 1976. The well is uncovered and full of water. Fluorescent tubes contain mercury. An additional two wells were identified as being used for fluorescent tube disposal. The broken fluorescent tubes and contaminated soil was removed from all three wells. This SWMU includes the well identified in the Environmental Baseline Survey (EBS) prepared for the Army by Aguirre Engineers, dated October 1998, as being located in Parcel 1-7(4)HR. Install monitoring wells and sample to verify that the contents of the three wells did not have an adverse impact to groundwater. The remaining well will be closed in accordance with KDHE well abandonment requirements.

SWMU-55

OLD ADMINISTRATIVE BUILDINGS

The Old Administrative Buildings are located in the northeast portion of SFAAP. SWMU 55 is soil with potential lead-based paint next to the Old Administration Buildings. This SWMU is located in Parcel 1-1(1) shown in the EBS. Lead-based paint removal is not ER,A eligible.

SWMU-56

MONITORING WELL SOUTH OF FACILITY 211

The Monitoring Well South of Facility 211 is located in the northeast portion of SFAAP. SWMU 56 is the area of nitrate/nitrite contamination in the area south of Facility 211. Contamination has been documented in a monitoring well south of this facility. This SWMU is located in Parcel 1-25(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete a RFI. Groundwater characterization will attempt to identify the potential source of contaminants includes geoprobe sampling (20 locations shallow and deep) and installation of 4 monitoring well clusters (shallow and deep).

SWMU-57

CHEMICAL PREPARATION HOUSE

The Chemical Preparation House (Facility 507-2) is located in the north central portion of SFAAP. Chemicals may have been disposed on the ground outside of this building. This SWMU is located in Parcel 1-27(7)HR(P) as shown in the EBS. Conduct RRSE sampling. Complete a RFI. USACHPM will conduct source investigation for SVOC contamination.

SWMU-58

COMBINED SHOPS AREA

The Combined Shops Area is located in the north central portion of the plant, and was used for maintenance activities and repairs. There are a total of 30 facilities in the area. The facilities include: three offices, the fuel oil unloading station, storage and distribution center, 12 storehouses, and nine shops. There was a Tram Repair Shop that was converted into a Heating Plant (Formerly Facility 522, Currently Facility 154-5). Several facilities in the Shop Area are visibly stained. This SWMU is located in Parcel 1-28(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete a RFI.

SWMU-59

LAUNDRY FACILITY

The Laundry Facility (Facility 4562) is located in the north central portion of the plant. This facility was used to launder worker clothing to remove process wastes and propellant contamination. The Laundry Shop was a single story facility with a concrete floor containing several sumps and drains. There were two fuel oil tanks located outside of the facility. This SWMU is located in Parcel 1-30(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete a RFI.

SWMU-60

OLD PHOTOGRAPHIC LABORATORY

The Old Photographic Laboratory is in the southeast corner of the Old Administration Building No. 2 (Facility 214) which is located in the northeast portion of SFAAP. Wastes from the laboratory were commonly dumped into the sink, which may have discharged directly to soils behind the facility. Cleanup inside the building will be handled outside of ER,A. This SWMU is located in Parcel 1-31(7)HR(P). Conduct RRSE sampling. Complete a RFI.

SWMU-61

ENVIRONMENTAL LABORATORY (FACILITY 232)

The Environmental Laboratory (Facility 232) is located in the north central portion of the plant. The Environmental Laboratory was built in 1982 and contains sumps and drains. Past waste disposal practices are not documented. This SWMU is located in Parcel 1-32(7)HR(P) shown in the EBS. This is an active lab and is not ER,A eligible. Future actions will be administered outside the ER,A program.

SWMU-62

TRANSFORMER STORAGE WAREHOUSE (FACILITY 566-5)

The Transformer Storage Warehouse (Facility 566-5) is located in the north central portion of the plant. At the time of the EBS, this facility stored 149 replacement transformers. Based on visual inspections, several stains were observed on the concrete floor, and some of the transformers currently stored in the facility were observed to be leaking. The facility is considered a potential area of concern. All of the transformers currently stored were tested for PCB content and were below 50 ppm; however, labels were lacking on most of the transformers. It was impossible to determine if all the stains noted were caused by the transformers currently stored or by transformers previously stored at the facility. Cleanup and disposal of the transformers and building will be administered outside the authority of ER,A. This SWMU is located in Parcel 1-34(7)HR(P)/PR(P) shown in the EBS. Conduct RRSE sampling. Complete RFI.

SWMU-63

WATER TOWERS (FACILITIES 127-1, 127-2, 127-3 AND 127-4)

The Water Towers (Facilities 127-1, 127-2, 127-3 and 127-4) are located in the north central portion of the plant. The surface soil surrounding the Water Towers is potentially contaminated with lead, originating from lead-based paint (LBP). The towers were painted several times before 1978, and sandblasted each time before they were repainted. Documentation was available to confirm that no measures were taken to contain the removed paint during or after sandblasting operations. This SWMU is

located in Parcel 1-35(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete RFI.

SWMU-64

PAPER BURNING GROUND

The Paper Burning Ground is located in the east central portion of the plant. Trenches were observed on aerial photographs encompassing 100 X 50 feet. Contaminants may have extended to a depth of 15 feet below ground surface. This SWMU is located in Parcel 1-38(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete RFI.

SWMU-65

TANK FARM

The Tank Farm is located in the north central portion of the plant, Parcel 8-2(7)HR(P) as shown in the EBS. The tank farm received and processed recycled solvents. Numerous releases have been documented from within the Tank Farm. Although tanks have been removed, the foundations and saddles remain. Conduct RRSE sampling. Complete RFI.

SWMU-66

INSTALLATION-WIDE SURFACE WATERS

This site will be designated for sampling the installation-wide surface waters of Captain, Hanson, Kill, and Spoon creeks. Initial stream surface water and sediment sampling was conducted under SAAP-014, except for Hanson Creek, which was conducted under SAAP-002. Results of sampling will be used to develop the RRSE Rating.

SWMU-67

SOUTH ACID AREA

The South Acid Area is located in the east central portion of SFAAP, and consists of the tanks, troughs, pipes and other conveyances. The ditches from the South Acid Area to Pyotts Pond are included in SAAP-039. This site includes the areas identified as AOC 7, Former Truck Maintenance Shop in South Acid Area, AOC 8, Former Fuel Oil Storage Tank in South Acid Area, and AOC 9, Oil and Paint House in South Acid Area. Additional samples will be collected. Results of this sampling will be used to develop the RRSE Rating. Soil removal may be required. LTM will follow.

AOC-1

MONITORING WELL WEST OF THE OLD ADMIN AREA

The Monitoring Well West of the Old Administration Area is located in the northeast portion of SFAAP. AOC 1 is the area of nitrate/nitrite groundwater contamination west of the Old Administration Area. Contamination has been documented in a monitoring well in this area. This AOC is located in Parcel 1-26(7)HR(P) shown in the EBS. Conduct RRSE sampling. Complete RFI.

AOC-2

MAIN ELECTRICAL SWITCH YARD (FACILITY 154-4)

The Main Electrical Switch Yard (Facility 154-4) is located in the center of the plant. Based on interviews with former employees, a transformer fire resulting from a lightning strike occurred around 1945. The majority of the transformers (assumed to contain PCBs based on the time period) were said to have been destroyed by the fire. This site is currently active and will not be addressed under ER,A. This AOC is located in Parcel 1-29(7)HR(P) shown in the EBS. Future actions will be administered outside the ER,A program.

AOC-3

NEW PHOTOGRAPHIC LABORATORY (FACILITY 227-18)

The New Photographic Laboratory (Facility 227-18) is located in the north central portion of the plant and operated between 1990 and 1998. Based upon interviews, a common waste disposal practice in the photography laboratories was to dispose of the wastes in the sinks. The location of the sink drain outfall has not been identified. Because this facility was active after 1986, it is not eligible for remedial action under ER,A. This AOC is located in Parcel 1-33(7)HR(P) shown in the EBS. Future actions will be administered outside the ER,A program.

AOC-4

DISPOSAL AREA SOUTHWEST OF STP

The Disposal Area Southwest of the STP (Sewage Treatment Plant) is located in the northeast portion of SFAAP. This AOC is the area southwest of the STP where several trenches were noted on aerial photographs. This area may have been the Mess Hall Landfill. This AOC is located in Parcel 1-37(7)HR(P) shown in the EBS. Complete RRSE sampling.

AOC-5

CANNON RANGE TUNNELS (FACILITY 303)

AOC 5 is the Cannon Range Tunnels located in the eastern portion of SFAAP. During the 1998 EBS site investigation of the Cannon Range Tunnels (Facility 303), it was noted that 32, 55-gallon drums were stored within the southern tunnel. The drums were labeled as either "metal from 11 test," "from pond area," or "wood scrap from gap test." Iron piping material, commonly used for explosivity testing, was observed in the drums. The greatest potential for surface soil contamination was anticipated to be along the firing line leading from the platforms to the tunnels and within the tunnels. During a 1988 RI field program conducted at the Cannon Range, six surface soil samples were collected downrange of the firing line and a composite sample was collected from each tunnel. Samples were analyzed for priority pollutant metals, explosives, and EP toxicity. Analytical results indicate that explosives and metals were present in the soil at low levels. This AOC is located in Parcel 2-11(7)HR(P) shown in the EBS. Complete RRSE sampling. Complete RFI.

AOC-6

35 PROCESS FACILITIES WITHIN F-LINE AREA

AOC 6 consists of thirty-five process facilities located to the west of the F-Line Area, in the east central portion of the plant. This AOC is located in Parcel 2-18(7)HR(P) shown in the EBS. This parcel has been delineated to include each of the following facilities D120-7, F120-4, F120-8, 181-3, 563, 5815-1, 5815-2, 5815-3, 5816-2, 5822, 5823, 5837, 5850, 5861, 7803-1, 7803-2, 7803-3, 7803-4, 7814, 7815-1, 7816-1, 7816-2, 7816-3, 7826, 7827, 7828, 7832, 7866, 7868-1, 7868-2, 7868-3, 7868-4, 7871-2, 7897, and 7898. Complete RRSE sampling. Complete RFI.

AOC-7

FORMER TRUCK MAINTENANCE SHOP IN SOUTH ACID AREA

The Former Truck Maintenance Shop in South Acid Area consists of the area where a methylene chloride release was detected in the South Acid next to the Former Truck Maintenance Shop. This AOC is located in Parcel 3-4(3)HR shown in the EBS. This site is consolidated under SAAP-067.

AOC-8

FORMER FUEL OIL STORAGE TANK IN SOUTH ACID AREA

The Former Fuel Oil Storage Tank in South Acid Area consists of the area where a chloroform release was detected in the South Acid next to the Former Fuel Oil Storage Tank. This AOC is located in Parcel 3-5(3)HR shown in the EBS. This site is consolidated under SAAP-067.

AOC-9

OIL AND PAINT HOUSE IN SOUTH ACID AREA

Oil and Paint House in South Acid Area consists of the area where a methylene chloride release was detected in the South Acid next to the Oil and Paint House. This AOC is located in Parcel 3-6(3)HR shown in the EBS. This site is consolidated under SAAP-067.

AOC-10

STORAGE MAGAZINES NOT PART OF SWMU 15 & 16

AOC 10 consists of specific storage magazines not included in SWMUs 15 and 16, resulting from potential releases from approximately 100 storage magazines on the southern end of the plant. This AOC is located in Parcel 4-1(1) shown in the EBS. Complete RRSE sampling. Complete RFI.

AOC-11

FORCED AIR DRYERS AND REST, SCREEN & CAN PACK HOUSES

AOC 11 consists of Forced Air Dryers, Rest Houses, Screen Houses, and Can Pack Houses in Parcel 5-10(7)HR shown in the EBS. Located in the west section of the plant, this area of concern requires initial characterization to determine if chemicals of potential concern exist above regulated levels. Complete RRSE sampling. Complete RFI.

AOC-12

PASTE AIR DRY FACILITIES

AOC 12 consists of Paste Air Dry facilities in Parcel 5-13(7)HR(P) shown in the EBS. Located in the center of the facility, this area requires confirmation sampling to determine if chemical of potential concern exist above regulated levels. Complete RRSE sampling. Complete RFI.

AOC-13

GENERAL WAREHOUSES (8037 SERIES)

AOC 13 consists of eight large warehouses that have been listed as containing such items as unused NQ drums (pre-NQ packaging) storage, acid plant parts & supplies, and (3X) contaminated equipment interim storage. The 8037 series warehouses are located in Parcel 5-14(7)HR(P) shown in the EBS. The parcel delineation includes the warehouse buildings and adjacent railroad/loading dock areas. This site is not ER,A eligible.

AOC-14

ROBERT'S LAKE

AOC 14 consists of Robert's Lake and ditches draining into the lake. Robert's Lake is located south of the Old Sanitary Landfill and west (downgradient) of the G-line ditches from Segment 5. This AOC is located in Parcel 6-7(7)HR(P) shown in the EBS. Complete RRSE sampling. Complete RFI.

AOC-15

HAZARDOUS ANALYSIS TESTING LABORATORY

The Hazardous Analysis Testing Laboratory (AOC 15) is located in the north central portion of the plant. This area consists of an indoor firing range which has piles of sand containing expended small-caliber test projectiles. The sand piles are situated just outside a door on the south side of the building, and measures 60 X 30 feet. This AOC is located in Parcel 7-2(5)HR shown in the EBS. Complete RRSE sampling. Complete RFI.

AOC-16

NC PRODUCTION LINES

AOC 16 consists of NC (Nitrocellulose) production lines B, C, D and E, the Solvent Type Propellant Mix and Form Areas located in the north central portion of the plant. The NC Production Lines produced NC during the periods of 1943-1960, and 1965-1971. Nitrocellulose and other hazardous constituents were released to the soil and potentially the groundwater in the proximity of the production facilities. This AOC is located in Parcel 8-2(7)HR(P) shown in the EBS. Complete RRSE sampling. Complete RFI.

AOC-17

NQ PRODUCTION FACILITIES

AOC 17 includes all buildings which have been identified as being potentially contaminated with explosives located in Parcel 9-5(6)HR shown in the EBS. The NQ Production Facilities are located in the northwest portion of SFAAP. Based a review of the documents, visual inspections and interviews, there is evidence that NQ contamination is pervasive throughout and observed leaching out of walls and floors during the 1998 EBS visual inspection. Complete RRSE sampling. Complete RFI.

AOC-18

TRENCH DISPOSAL AREA A3

AOC 18 is the Trench Disposal Area identified as A3 in 1948 aerial photographs from disturbed ground west of SAAP-001, the classification area located in the northeast portion of SFAAP. Integrated into the scope for SAAP-001.

AOC-19**TRENCH DISPOSAL AREA A4**

AOC 19 is the Disposal Site identified as A4 in 1948 aerial photographs from disturbed ground on the southwest end of SAAP-001, the classification area located in the northeast portion of SFAAP. Integrated into the scope for SAAP-001.

AOC-20**TRENCH DISPOSAL AREA A5**

AOC 20 is the Disposal Pit identified as A5 in 1948 aerial photographs from disturbed ground east of SAAP-001, the classification area located in the northeast portion of SFAAP. Integrated into the scope for SAAP-001.

AOC-21**TRENCH DISPOSAL AREA A6**

AOC 21 is the Disposal Trench identified as A6 in 1948 aerial photographs from disturbed ground south of SAAP-001, the classification area located in the northeast portion of SFAAP. Integrated into the scope for SAAP-001.

AOC-22**OLD RECLAMATION YARD**

The Old Reclamation Yard is located in the northeast portion of the plant. This disposal site identified as A8 in 1948 aerial photographs from disturbed ground in a fenced area south of the Classification Yard. Complete RRSE sampling. Complete RFI.